Modular Cavity update

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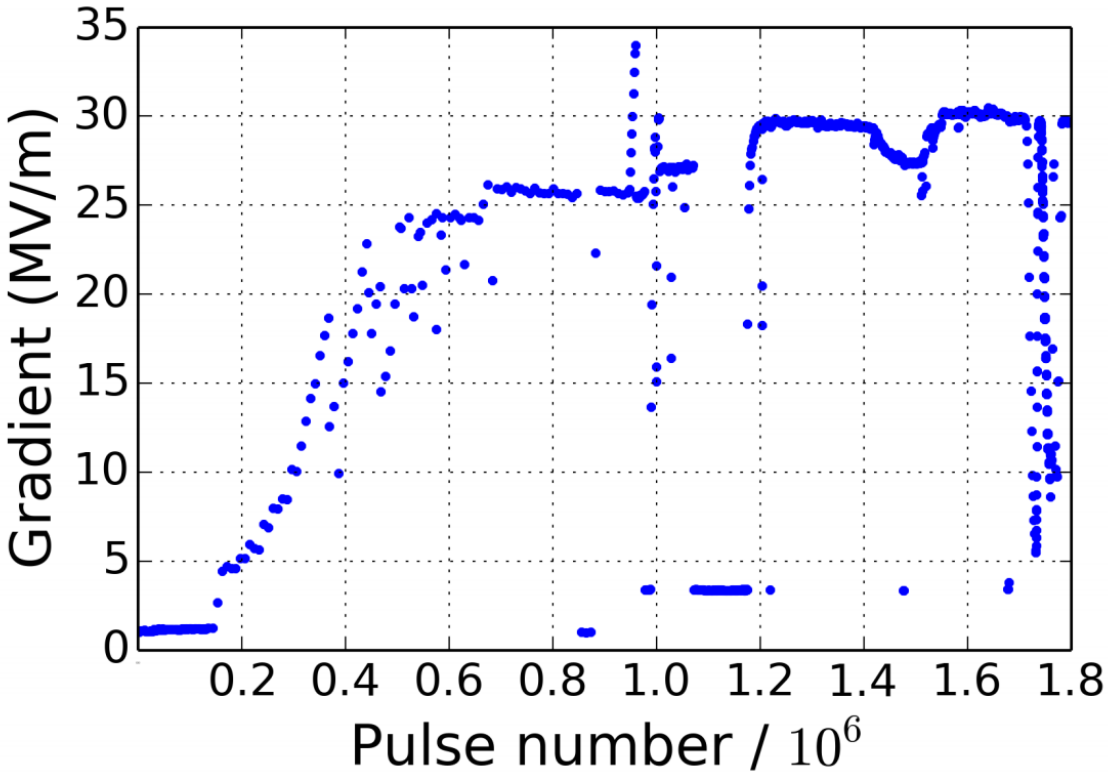
Summary of the previous run

- 17-21 April 24/7 operation, 100% shift coverage
- 5Hz/2Hz rep rate, 1.8M pulses
- Conditioned the cavity in B = 0T up to 30MV/m with ~12-20 “real” sparks
- Accumulated ~0.5M at 30MV/m
- Maximum Safe Operating Gradient was not established due to time and power constraints



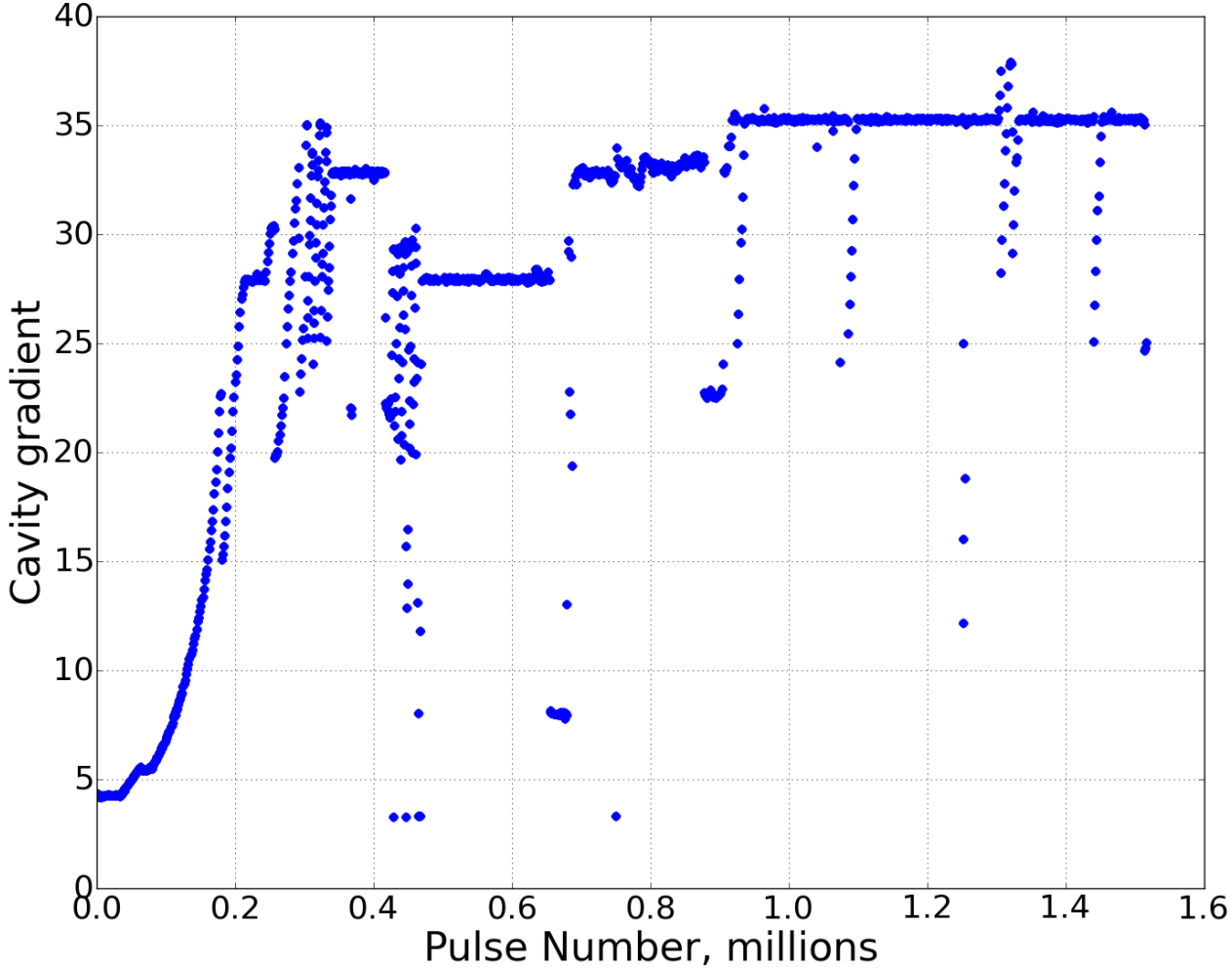
Current run

Goal: Establish Maximum Safe Operating Gradient (spark rate is below 10^{-5}) in B=0T

- The klystron was disassembled and operated on, back online in early August
- Chiller problems, fixed by Aug 13th (Thursday)
- Planned Linac power outage on weekend Aug 15th-16th
- Run started afternoon on August, 17th (still in progress)
- Two our best scopes were out for repair

Current run

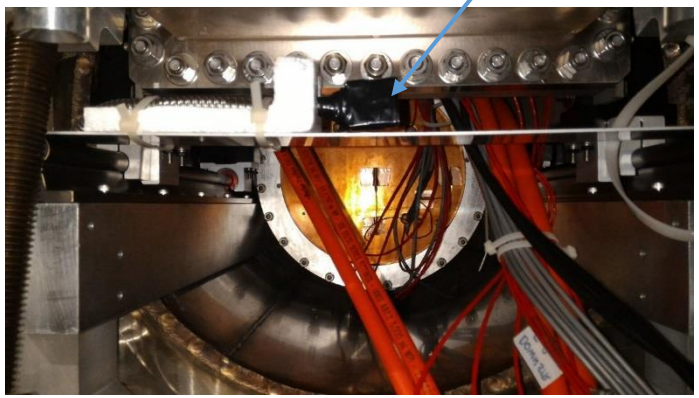
- 24/7 operation, 100% shift coverage (huge thanks to shifters)
- Accumulated ~1.5M pulses
- ~ 10 “real” sparks so far
- 15% discrepancy between gradient values obtained from PU1 and PU2 -> will recalibrate after the run
- Currently sitting on 35MV/m, for 0.5million pulses, 4 real sparks so far
- To verify spark rate with ~30% certainty, would need to observe 10 sparks



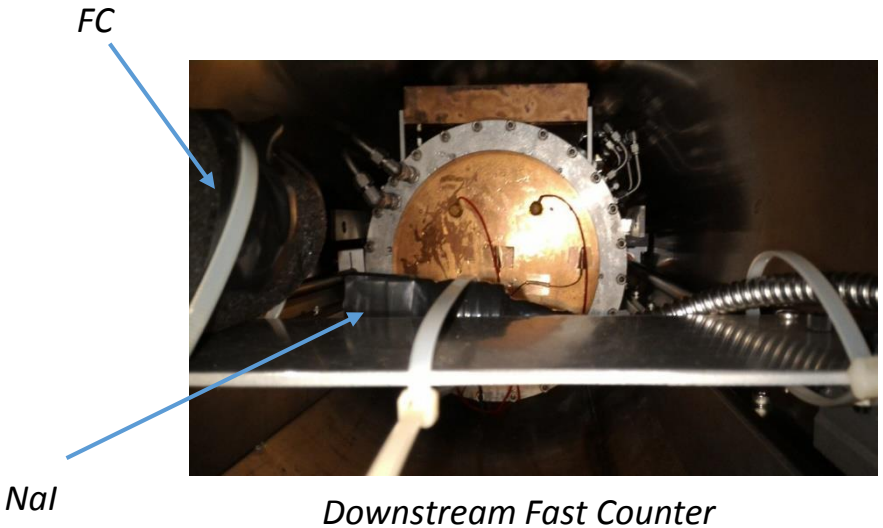
DAQ channels

- two RF pickup loops
- two RF cavity light signal (optical ports)
- Forward, Reflected power (klystron output, circulator, waveguide directional coupler on waveguide near cavity)
- NaI radiation detector
- Two fast scintillating counters
- Logged by ACNET: vacuum pressure at various gauges, water flow rate/temperature, radiation activity etc.

http://mice.iit.edu/cgi-bin/mta/acnetize?Config=ModularShift



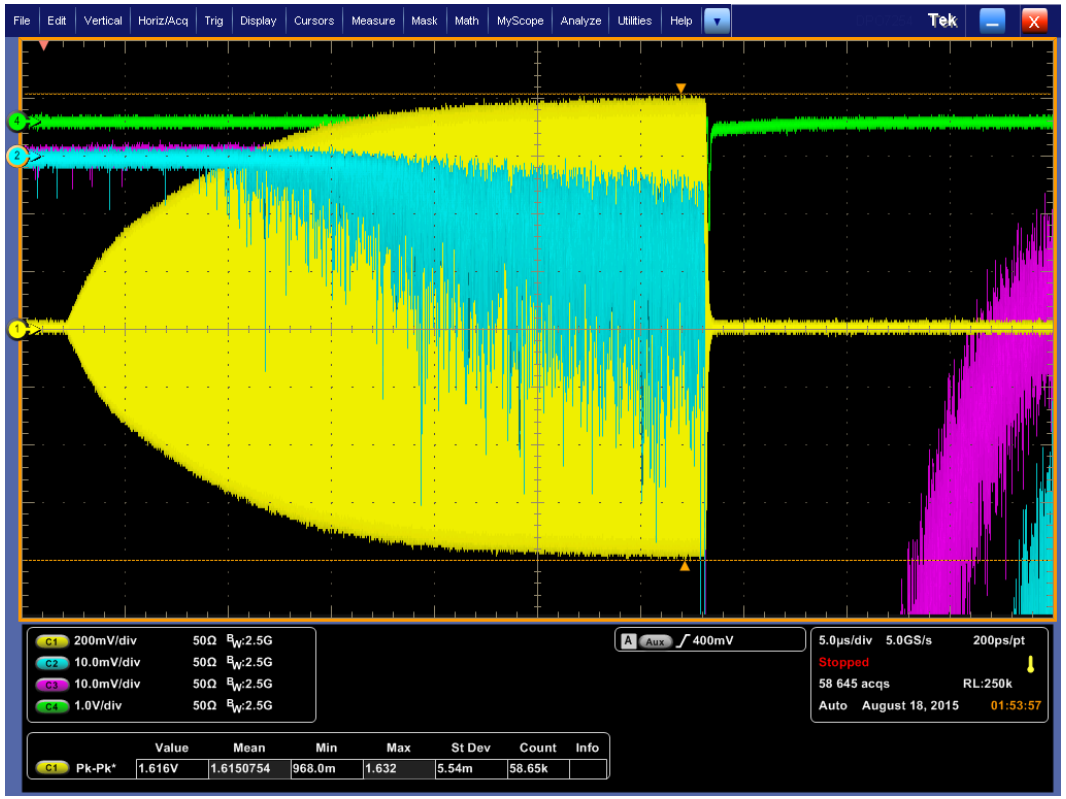
Upstream Fast Counter (FC)



Downstream Fast Counter (FC) and NaI detector

DAQ performance

- General good performance
- Dave Peterson is on vacation, that makes our life slightly more miserable
- Lecroy scope is back from repair on Wednesday, Aug 19th . Still working on implementing it into current DAQ configuration.
- Scopes seems to randomly miss sparks at 5Hz rep rate, probably trigger latency /network overload problem



Spark event example (Tek7254)

Summary and future plans

- Main goal is to establish maximum safe operating gradient in B=0T magnetic field
- Labview DAQ and spark detection works well. Some development is still needed for optimal data acquisition process
- Run would take several more days (1M pulses at 5Hz ~ 2.5 days)
- Emission spectrum study at the end of the run
- Cavity interior inspection, copper lifetime study